

The complex path to biofuel sustainability

Until a few years ago, working on biofuels called for constant justification in the face of electric vehicles (EVs) taking over the world. Today, while there is no doubt that EV adoption has amplified over the years, there is growing awareness of the fact that no decarbonisation strategy is trade-off-free. For instance, for a transition to EVs, existing internal combustion engine (ICE) vehicles and the supporting infrastructure need to be replaced entirely, which is capital intensive. Further, the required batteries and critical minerals used in them need to be imported, adding to environmental concerns on how these minerals are mined, among other issues. Biofuels, on the other hand, can be used in existing ICE engines and infrastructure with little to no modifications (depending on the blending rates) and offer import independence.

However, 'biofuel' is a blanket term that includes both sustainable and unsustainable fuels, and an understanding of their difference will be essential to drive effective decarbonisation action.

The challenges in India

In India, biofuel is synonymous with first-generation (1G) ethanol, which is primarily sourced from food crops. The policy target in India of achieving 20% ethanol blending with petrol (E20) by 2025-26 is expected to be met almost entirely by 1G ethanol made from sugar cane and foodgrains. Second-generation (2G) ethanol, which is made from crop wastes and residues, is unlikely to contribute much to achieving this target due to several challenges related to feedstock supply chain and scaling up.

The groundwater depletion implications of growing sugar cane are well known, but the food security implications of groundwater depletion and of using foodgrains for ethanol production are harder to imagine because India is currently a



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surplus food producer. But there are several reasons why diverting the surplus produce towards energy or specifically growing a crop for energy may not be a sustainable strategy.

First, India's crop yields have already stagnated, and global warming is expected to reduce yields, which means that the same area under cultivation (arable land) will produce less with time but will need to suffice for a growing population. So, our strategy to meet blending targets cannot depend on surplus crop production.

Second, a recent study led by the University of Michigan projected that the rates of groundwater depletion could triple during 2040-81 compared with the current rate. This is again attributable to temperature rise and the resultant increase in crop water requirements. With such limited resources, be it groundwater or arable land, food production should be prioritised over fuel.

Third, the agriculture sector is one of the hardest-to-abate in terms of direct greenhouse gas (GHG) emissions. So, increasing GHG emissions from this sector for motor fuel production in order to decrease GHG emissions from the transport sector is an unnecessary balancing loop that would achieve little net benefit.

In India, the ethanol blending policy has been a good strategy to deal with the surplus sugar production. Another good strategy to deal with the surplus sugar production would be to reduce surplus sugar cane cultivation. Increasing farmer income is often waved as a white flag in response to this argument, but sugar cane being a remunerative crop has more to do with government intervention than anything else. This means that any unassuming crop could be made as remunerative as sugar cane if so desired.

'Sustainable' biofuels are produced from crop residues and other wastes, with low water and GHG footprint. The Global Biofuels Alliance that

was formed at the G-20 Summit in New Delhi last week is expected to strengthen the development of sustainable biofuels, in addition to promoting ethanol uptake. It is, therefore, a historic moment for India, demonstrating its commitment to climate action with global cooperation.

Sustainable biomass use

The Energy Transitions Commission, in its report on 'Bioresources within a Net-Zero Emissions Economy', recommended that biomass should be prioritised for use in sectors where there are limited low-carbon alternatives. Long-haul aviation and road freight segments, wherein complete electrification might take longer to achieve, could make the cut, whereas petrol vehicles (for which ethanol blending is currently being targeted) would probably not.

According to the International Energy Agency, to achieve net-zero emissions by 2050 globally, sustainable biofuel production needs to triple by 2030 to fuel modes that have few other mitigation options. Although 1G ethanol is unlikely to fit the bill, 2G ethanol could be counted as a sustainable fuel, especially if the production is decentralised, i.e., crop residues do not have to be transported large distances to a central manufacturing plant. But this might affect achieving economies of scale for the 2G plant.

Balancing economies of scale with the energy needs (and costs) of biomass collection and transport across large distances is a major challenge. The Global Biofuels Alliance could help drive innovation and technology development in establishing an efficient biomass supply chain and smaller-scale decentralised biofuel production units.

Achieving true sustainability is complex, especially with respect to biofuels. Therefore, any strategy should be carefully examined in the context of the larger ecosystem to avoid unintended negative consequences.

A mockery of pedagogic ethics, the breaking of a bond

Imagine a teacher who asks the classmates of her seven-year-old student to slap him one by one. Those who do so softly are asked to hit the boy harder. One is naturally curious to know where the teacher was trained. And, who appointed her as a teacher? The short answer is that the teacher is an educational entrepreneur like tens of thousands of others. She runs her own private school in a village of Uttar Pradesh. Like thousands of other schools like hers, it is recognised by the government. For now, it has been closed down because the incident caused a stir, and perhaps some embarrassment.

Gaps in teacher training

News from schools regularly reminds us that the momentum generated by the Right to Education (RTE) Act that was enacted over a decade ago has subsided. The RTE had laid down indicators of quality, and for a while, an attempt was made in a few States to use RTE-compliance criteria for both government and private schools. COVID-19 was not the only factor responsible for the loss of momentum in taking the RTE seriously. Parallel spheres of neglect surfaced in the crucial sector of teacher training.

Since the 1990s, teacher training has become a beehive of small-time entrepreneurs. The regulatory structure of the National Council for Teacher Education (NCTE) has not been able to enforce its meticulously worked out norms. In 2008, the Supreme Court of India appointed a commission under the late Justice J.S. Verma to examine the various ailments of teacher training. His magnificent report, submitted in 2012, offered some hope that the training of teachers would gain status and attention, but that hope proved short-lived. Improvement of quality by the inspection *ruj* proved an illusion. Last month, the Supreme Court passed its verdict in a case concerned with teacher training at the primary level. The Court said that the NCTE has not applied its mind while allowing Bachelor of Education (BEd) degree holders to teach at the primary level – BEd is traditionally associated with secondary education).

The Muzaffarnagar (Uttar Pradesh) story – where the teacher asked her students to slap another student – gains further poignancy



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because the child who was victimised by his teacher is a Muslim.

According to reports, rural leaders, some well known as farmer leaders, have advised the boy's parents to avoid pursuing the case. Otherwise, these leaders feel, the episode will vitiate communal relations (the district saw riots a few years ago). The teacher herself reportedly saw no reason to be contrite as she considers it her job to control children in order to tackle them. She thought the episode was being blown out of proportion. What are these proportions, one might ask.

Chattopadhyaya's effort

One of the many reports written since India's Independence tried to spell out what might constitute appropriate professional conduct by adults who serve as teachers. This report is known as the Teacher Commission report. It was chaired by D.P. Chattopadhyaya. He was a philosopher and his commission included some of the best minds available to reflect on teaching. The report showed how far school teaching in India was from standards and ethics that one might regard as professional. Many decades have passed since that report was submitted and hardly anyone reads it now. A summary of recommendations is available on the Internet for the benefit of students facing an examination such as BEd without attending classes. It is hardly cynical to say that Chattopadhyaya's recommendations are quite irrelevant. The new ethos of education, and not just in U.P., promotes easy instrumentality, and never reflection or introspection. We cannot expect the teacher who asked her students to slap the seven-year-old Muslim boy to reflect for a moment on her conduct.

The Chattopadhyaya report had advocated a well-read, thoughtful teacher who is conscious of her decisions and actions. That view found limited traction in the Indian system, especially in the bureaucracy governing it. It continued to regard the teacher as a minor functionary. During the 1990s, the compulsions of structural adjustment led to the loss of what little dignity teachers of small children had enjoyed. North Indian States had no problem opting to recruit teachers en masse on contractual or ad hoc basis

under euphemistic titles. Reckless privatisation implied that market laws should prevail in deciding emoluments. Enrolment grew, but there was no lasting improvement in working conditions. Under the influence of the global policy adviser James Tooley, low-budget private schools multiplied, enabling State governments to merge their own smaller schools in the name of rationalisation.

The shattering of a bond

So, here we are, with a teacher defending her unique style of meting out corporal punishment to a boy. All familiar bells are ringing dutifully, to remind us that human rights, minority rights, and child rights still matter in Uttar Pradesh. No resonating sound, let alone an outcry, can be heard rising from the community of teachers. The reason is simple: there is no such thing as a community of school teachers.

Teachers' Day (September 5, the birth date of Dr. Sarvepalli Radhakrishnan, former President of India and statesman) ought to have reminded us that the nation gains little when it enfeebles the school teacher's voice – individual and collective. It is not a fantasy that Dr. Radhakrishnan would have entertained. He taught in benign times, when institutions of higher learning enjoyed a modicum of freedom and teachers emerged from training colleges with a thought or two about how to look after children. Many still have that ability, and their heads will hang with exhaustion when they read about the Muzaffarnagar incident.

The administrative machinery in U.P. has shut down the school. The teacher, also the school head, made a mockery of pedagogic ethics. The child who suffered her wild imagination will suffer the imprint of his experience. By separately assigning a day for teachers and another one for children, we seem to have forgotten that the two form a bond. No worthwhile education can take place when the bond breaks. The Muzaffarnagar teacher is reportedly not even sorry that she shattered the bond so wantonly. For her, the great advances of child psychology never took place. Nor would she care if told that Rabindranath Tagore and Gijubhai Badheka – who created an Indian version of the Montessorian approach – had pleaded for adult kindness towards children.